Appendix B Landscape Analysis

Past management practices have modified the forest structure and composition in the Swauk. This includes fire exclusion, harvesting from "above", clear-cutting, production forestry plantation management, mining timber extraction, development of a large transportation network, and altered riparian influence zones. These actions have resulted in an altered landscape that have departed from the natural conditions and create a condition of a less resilient forest ecosystem. The tool used to evaluate this departure is the The Ecosystem Management Decision Support framework provides a useful tool for integrated landscape evaluation and planning (Hessburg et al. 2004).

Alterative 1 retains the existing departed landscape condition.

Alternative 2 repairs departures and make the landscape more resilient. Treatments are focused on buffering the best quality late successional habitat from stand replacement fire, making the landscape more resilient. The treatment creates a polygon of 4947 acres of stem exclusion open and stem exclusion closed canopy which buffers late successional forest and creates a more sustainable patches of forest.

Table below outlines the landscape departures for Alternatives 1, (No Action) and Alternative 2, the preferred alternative.

Table 1-B Landscape Departures Pre and Post Treatment

Cover x Structure Type	Alt. 1 Current Percent Land Occupancy	HRV Percent Percent Land Occupancy	Alt.2 Percent Land Occupancy	Alt. 1 Current Patch Density (#Patches/ 100 ha.)	HRV Patch Density (#Patches/ 100 ha.)	Alt.2 Density (#Patches/ 100 ha.)	Alt.1 Current Mean Patch Size (ac.)	HRV Mean Patch Size (ac.)	Alt.2 Mean Patch Size
Young Forest Multi-Storied (Grand fir)	5.87%	.11%	5.64 %	27.14	0	18.10	99.67ac.	282.79ac.	190.45ac.
Young Forest Multi-Storied (Douglas-fir)	22.17%	17.97 %	15.4 %	135.70	39.53	76.89	132.00ac.	412.31ac.	122.22ac.
Stem Exclusion Open Canopy (Ponderosa pine)	15.8%	35.84 %	20.1%	149.28	113.67	140.22	64.62 ac.	408 ac.	87.44ac.
Stem Exclusion Open Canopy (Douglas-fir)	4.72%	10.5%	12.56%	149.28	121.40	85.96	33.53 ac.	170 ac.	51.35 ac.
Old Forest Single Storied (Ponderosa Pine)	1.75%	2.16%	1.75%	4.5	4.94	2.21	19.56ac.	232.64ac.	29.51ac.
Old Forest Multi-Storied (Douglas-fir)	0.14	2.06%	.145%	36.18	14.82	4.52	29.51ac.	121.32ac	19.56 ac.
Shaded Cells = Improved Landscape Trend									

The figures below depict the pre and post treatment forest structure types.

Figure 1Pre Treatment Structure Class

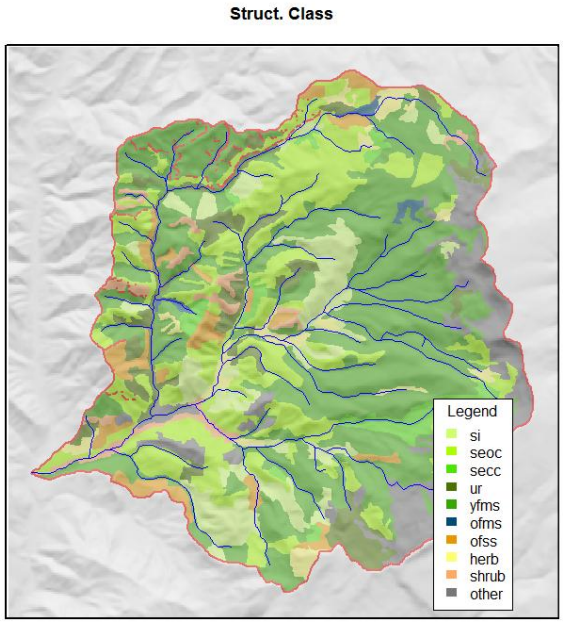
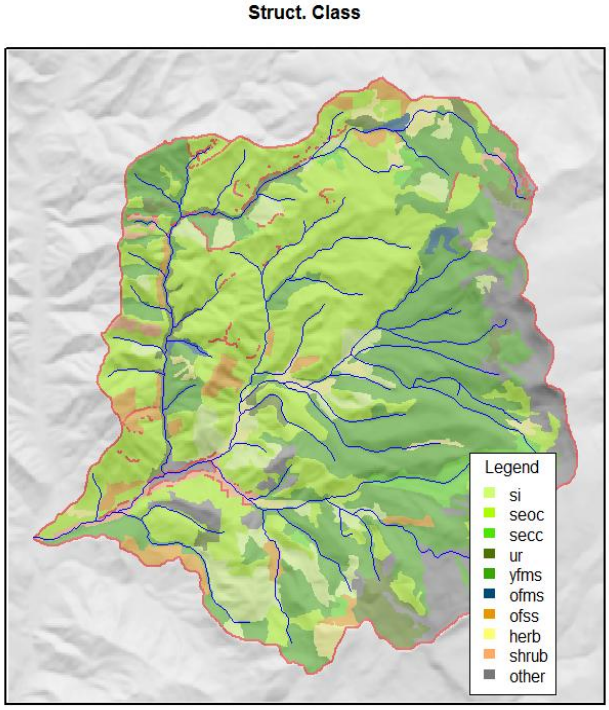


Figure 2 Post Treatment Structure Class



Figures 3 and 4 depict the landscape metrics for Alternative 1 and 2.

Figure 3 Alt. 1 Landscape Metrics

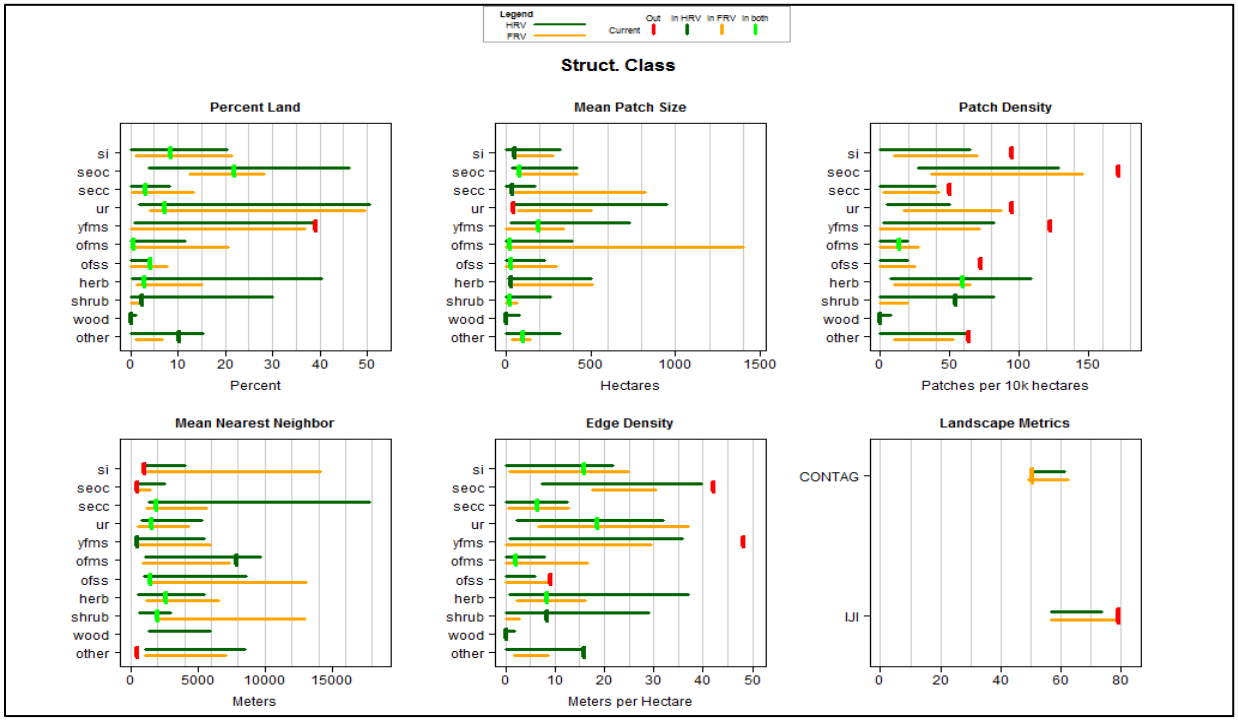
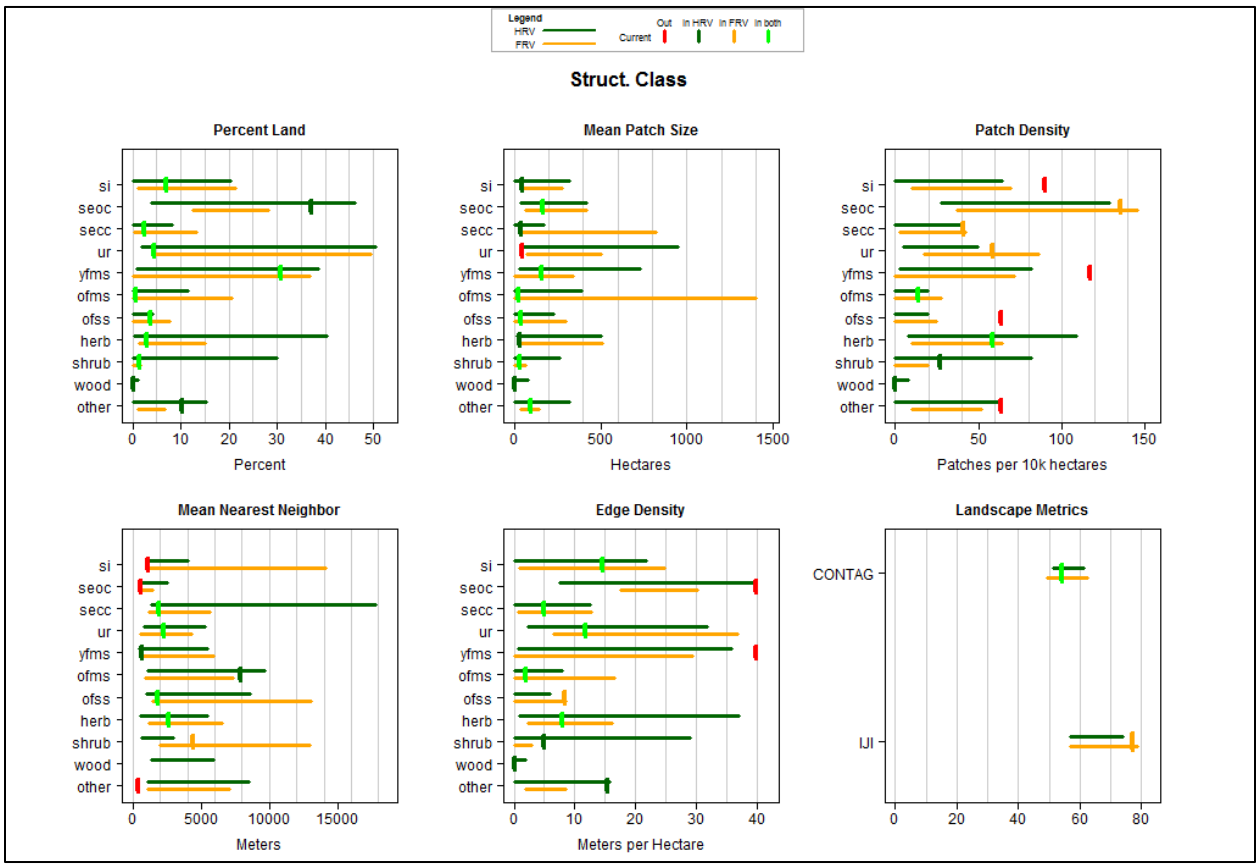


Figure 4 Alt. 2 Post Treatment Landscape Metrics



Alternatives 2 repairs many landscape metrics and moves the landscape ***towards a higher level of resiliency.*** This is because:

- The percent land of cover types in young forest multi-storied (YFMS) forest is reduced.
- The deficit of stem exclusion open canopy (SEOC) is eliminated and the patch size is restored. Thinning will promote large tree growth on a range of 2829 (Alt. 2) and 2758 (Alt.3) acres. These acres will grow into old forest single storied (OFSS) or old forest multi-storied habitat (OFMS) habitat in 40-50 years, with trees > 25" DBH.
- Larger patches of all structure types are created, and edge density is reduced.
- Larger patches SEOC are created from YFMS structure, these larger patches are resistant to running crown fire and spruce budworm.
- Treatment areas are strategically planned around current LSH (500 acre core spotted owl) so that the potential for catastrophic fire in LSH forest reduced, while simultaneously growing large tree structure in thinned stands.
- Existing fragmented patches of LSH are treated by thinning and reforestation of plantations with native cover types; creating two new, larger patches of OFMS through time.
- Two large patches of future OFMS structure in Lion Gulch and Liberty Mountain are better protected from fire, insects and diseases.

Landscape departures were also measured for fire and fuels metrics and spruce budworm. The tables below summarize the efficacy of treatment versus no treatment for these variables.

The arrangement and connected nature of dense forest patches with a moderate and high crown fire risk are putting the landscape at risk for large scale loss of LSH habitat. The departures in flammability and spruce budworm risk are shown below.

Figure 5 Treatment Effects on Running Crown Fire

Running Crown Fire Class 4_d	Alt. 1 Current Patch Density (#Patches/ 100 ha.)	HRV Patch Density (#Patches/ 100 ha.)	Alt. 2 Patch Density (# Patches/100ac.)	Alt. 1 Current Mean Patch Size (ac.)	HRV Mean Patch Size (ac.)	Alt. 2 Mean Patch Size (ac.)
Low	49.77	130.96	68.8	708.34	196.26	560
Moderate	158.32	74.13	110.0	55.33	118.48	75.3
High	144.72	61.7	81.2	117.48	0	65.8

Figure 6 Treatment Effect on Spruce Budworm Habitat

Spruce Budworm Habitat	Alt. 1 Current Patch Density (#Patches/ 100 ha.)	HRV Patch Density (#Patches/ 100 ha.)	Alt. 2 Patch Density (# Patches/100ac.)	Alt. 1 Current Mean Patch Size (ac.)	HRV Mean Patch Size (ac.)	Alt. 2 Mean Patch Size (ac.)
Low	135.70	96.37	101.4	91.55	89.46	135.2
Moderate	158.32	118.61	123.1	112.33	44.97	66.6
High	117.62	44.78	67.5	261.88	263.69	240.1